CLAIMS

1. A method of producing a viable hybrid cell having a single functional mitochondrial population, comprising the step of introducing genomic DNA from a mitochondrially depleted donor cell into a recipient cell from which genomic DNA has been removed.

2. The method according to claim 1, wherein the recipient cell is an oocyte, a zygote, or a two-cell embryo.

3. The method according to a claim 1 or claim 2, wherein the recipient cell is in an arrested state during DNA removal.

4. The method according to claim 3, wherein the recipient cell is an oocyte which is arrested at metaphase of the second meiotic division when the genomic DNA is removed.

5. The method according to claim 3 or claim 4, further comprising the step of reactivation of the recipient cell after the genomic DNA has been removed, and preferably after the introduction of genomic DNA from the donor cell.

6. A hybrid cell producible by the method of any one of claims 1 to 5.

7. An animal producible from a hybrid cell in accordance with claim 6.

8. A method of producing a cloned embryo comprising the steps of (i) introducing genetic material comprising at least genomic DNA from a donor cell into an enucleated recipient cell whereby to form a hybrid cell, (ii) introducing sperm mitochondria into said recipient cell or said hybrid cell, and
(iii) causing said hybrid cell to divide to become an embryo.

9. The method according to claim 8, wherein step (ii) is undertaken prior to said hybrid cell dividing to form an embryo.

10. The method according to claim 8 or claim 9, wherein step (ii) is effected by introducing sperm mid pieces and tails.

11. The method according to any one of claims 8 to 10, further comprising the initial step of mitochondrially depleting said donor cell such that the hybrid cell produced has a single functional mitochondrial population.

12. A cloned embryo producible according to the method of any one of claims 8 to 11.

13. An animal producible from the cloned embryo in accordance with claim 12.

14. A method of producing a hybrid cell from a non-differentiated stem cell, said method comprising the step of (i) introducing cytoplasm from a

donor oocyte into an undifferentiated stem cell, whereby to cause said undifferentiated stem cell to behave as a recently fertilised oocyte.

15. The method according to claim 14, further comprising the step of mitochondrially depleting the stem cell prior to the introduction of cytoplasm from the donor oocyte.

16. The method according to claim 14 or claim 15, further comprising the step of introducing sperm mitochondria into the stem cell at the same time as, or prior to step (i).

17. The method according to claim 14 or claim 15, further comprising the step of introducing sperm mitochondria into the hybrid cell after step (i) has been effected.

18. The method according to claim 16 or claim 17, wherein the introduction of sperm mitochondria is effected by introducing sperm mid pieces and tails.

19. A hybrid cell producible by the method according to any one of claims 14 to 18.

20. An animal producible from the hybrid cell in accordance with claim 19.

21. A method of increasing the viability of an oocyte, a zygote or an embryonic cell, including an androgenone or a gynogenone, having

abnormally low numbers of mitochondria, comprising the step of introducing at least genomic DNA and cytoplasm from an oocyte, a zygote or an embryonic cell, including an androgenone or a gynogenone, having abnormally low numbers of mitochondria into a recipient undifferentiated stem cell from which the genomic DNA has been removed.

22. The method according to claim 21, further comprising the step of introducing sperm mitochondria into said recipient cell.

23. The method according to claim 22, wherein said sperm mitochondria are introduced into said recipient cell at the same time as, or shortly after the introduction of the embryonic genomic DNA and cytoplasm.

24. An animal producible from an oocyte, zygote or embryonic cell which has been subjected to the method of any one of claims 21 to 23.

25. The method according to one of claims 1 to 5, 8 to 11, 14 to 18 and 21 to 23, wherein the donor cell and/or the recipient cell is genetically modified.